

1. A transformation engine, comprising:
- an address generator;
- a butterfly unit coupled to the address generator;
- a twiddle LUT coupled to the address generator; and
- 5 a multiplexer having a first input coupled to the butterfly unit and a second input coupled to the twiddle LUT.
2. The engine of claim 1, wherein the butterfly unit computes fast fourier transform (FFT) operations.
- 10 3. The engine of claim 1, wherein the butterfly unit computes decimation in frequency fast fourier transform (DIF FFT) operations.
4. The engine of claim 1, wherein the butterfly unit computes fast Hadamard transform (FHT) operations.
- 15 5. The engine of claim 4, wherein the twiddle LUT contains twiddle factors set to one.
6. The engine of claim 4, wherein the twiddle LUT contains twiddle factors set to one.
7. The engine of claim 4, wherein input data belonging to FHT samples are mapped to predetermined inputs.
- 20 8. The engine of claim 7, wherein remaining input data is set to zero.
9. The engine of claim 1, further comprising an input buffer coupled to the butterfly unit.

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10. The engine of claim 1, further comprising an output buffer coupled to the multiplexer.
11. A method for performing a plurality of transformations, comprising:
determining a transformation operation to be performed on data; and
sharing a transformation engine between multiple transformation operations.
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12. The method of claim 11, further comprising setting the engine to select the transformation operation.
13. The method of claim 11, further comprising receiving the output of the transformation operation on the data.
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14. The method of claim 11, wherein the transformation engine can be selected to perform FFT or FHT operations.
15. The method of claim 11, further comprising setting twiddle factors to one.
16. The method of claim 11, further comprising mapping input data belonging to FHT samples to predetermined inputs.
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17. The method of claim 16, further comprising setting remaining input data to zero.
18. The method of claim 11, wherein the transformation engine processes decimation in frequency FFT.
19. The method of claim 1, further comprising buffering input data and output data.
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20. The method of claim 1, further comprising decoding radio frequency channel data from the transformed data.